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Chicago Auto Club Tour to Mammoth Cave.

Special Correspondence.

BARDSTOWN, Ky., July 2.—About fifteen of the thirty automobiles in which the Chicago Automobile Club members left Chicago on June 25, turned back from Cedar Lake, about fifty miles out of Chicago, owing to the extremely bad condition of the roads, but only a few miles farther on the roads became good and there from Saturday evening until near Tuesday noon, some busy with social functions to which they had been invited by resident motorists and others occupied with repairing and replacing tires and damaged rims. This tour so far has shown that the motors on almost all of the cars are reliable, and that the troubles are from Indianapolis was made, the party comprised Mr. and Mrs. C. W. Gray and two children, J. E. Fry, Mr. and Mrs. A. Scott Ormsby, from Minneapolis; Dr. Frank H. Davis, chairman of the runs and tour committee of the Chicago Club; Mr. and Mrs. J. B. Burdett, Mr. and Mrs. J. E. Stevens, and Mr. and Mrs. J. W. Scott. As

PARTY OF CHICAGO TOURISTS IN INDIANAPOLIS ON THEIR WAY TO MAMMOTH CAVE, KY.

the trip on into Lafayette, Indiana, was fine. The cars straggled into Lafayette all the way from the first three at 11 P. M., Friday until Saturday morning, and at 11 o'clock fifteen left for Indianapolis, escorted by the reception committee of the Indianapolis club in twenty machines.

Indianapolis represented the first stage of the tour. and the Chicago party waited mainly due to tires, lubrication, and circulation.

Some of the members of the party deserted at Indianapolis to make side tours to visit relatives and friends, but President Charles W. Gray, of the Chicago club, who started a day late from Chicago, and J. W. Scott, who started from Detroit, overtook and joined the party. When the departure the streets of the city were undergoing repairs and were in bad condition, H. O. Smith and Mr. Weidley, of Indianapolis, kindly piloted us out of town onto the old National Road that leads to Washington, D. C. At Jerusalem, ten miles out, the guides turned back, as the turnpike extends the seventy-two miles to Richmond, Indiana, without a turn. After waiting

half an hour at Greenfield, twenty-one miles out, for Mr. Burdett's car., which had dropped behind, it was decided to take luncheon there. From Greenfield the road was like a floor except where the Interurban trolley line passes through small villages and takes the middle of the road. The line has but recently been completed and the road had not been rolled since. In one place the street was almost impassable and at another a small bridge had gone out and the stream had to be forded. From Cambridge City, sixty miles out of Indianapolis, to Richmond, the road surely equals the renowned French highways.

Richmond, Indiana, was reached at 5.30 o'clock, and as there are no good hotels between there and Cincinnati, it was decided to remain over night and get an early start in the morning. Detailed accounts were gathered here of the twenty enthusiasts who had run down from Cincinnati on Sunday to meet the tourists, but returned home when they received word from Indianapolis that the party would be delayed there.

Local informants in Richmond asserted that the National road by way of Eaton, Ohio, was badly torn up owing to the construction of the Interurban Electric Railroad, and so the party split when the departure was taken on Wednesday morning, half going by a detour route. The road proved good as far as Boston, Ohio, fair to College Corner and as far as Oxford, but from there was rough until about two miles out of Hamilton. From Hamilton it was mostly good up to within about ten miles of Cincinnati. The rest of the way it was worse than any road yet driven over, and a spring on one of the cars was broken. The section that went over the other route reached Cincinnati first, and when the second section arrived reported that their roads had been fair all the way in. The eighty odd miles from Richmond were covered before noon. As a new tire casing for one of the cars that had been telegraphed for had not arrived, it was decided to remain in Cincinnati until Thursday morning.

The trip to Mammoth Cave, Kentucky, was resumed again at 8.30 A. M. on Thursday, when a start was made for Lexington, ninety-six miles. A toll charge of ten cents was made for each automobile crossing the suspension bridge over the Ohio, built in 1865, and at four miles out there was another charge of seven cents on the toll road, and thereafter every few miles a charge of five cents, until at eighteen miles out the tolls paid amounted to forty-seven cents. But from there on the Lexington pike was free. There was a continuous climb through Covington, Kentucky, on the river opposite Cincinnati, and for about four miles beyond, and for the rest of the way to Lexington it was up hill or down all the time. There was too much broken stone on the road to rush the hills, and the roads were too narrow for fast driving except in the last twenty miles, which are superb.

A good luncheon was served excellently at Williamstown, Kentucky, though it is but a village, and thereafter the scenery became very fine, although the weather was a little too warm to make the ride thoroughly enjoyable. The route lay through a number of small towns and the country changed for the better. The road became ideal, the farms looked more prosperous and the houses more pretentious and better kept up. At Georgetown, the first large town, the tourists were overtaken by Earl Fisher, of Indianapolis, who was on his way to the races at Lexington on the Fourth.

More tire troubles on this day emphasized the fact that with freedom from this annoyance touring in this part of the country would be very pleasant.

Thursday night was spent in Lexington, the center of Kentucky's famous race horse country, and at 8.30 o'clock on the following morning the tour was resumed. The run was first to the famous High Bridge, where the scenery was grand; thence to Danville, where the first real mishap occurred. A tire came off the rim of a Winton touring car, causing the machine to swerve into a telegraph pole, bending the rear axle badly. With the limited repair facilities at Danville, it was a question whether or not it could be straightened. President Gray waited over all afternoon to help the unfortunates and intended to follow the other tourists in the morning.

The Darracq car driven by Mr. Burdett came on as far as Springfield, and the writer kept on to Bardstown, eighteen miles further, in the Northern, running the last seven miles after dark and arriving at 8.30 o'clock in the evening. The little Northern has had no tire troubles but has suffered other slight breaks incidental to driving a light car over rough roads at high enough speed to keep up with the touring cars.

ARRIVAL AT MAMMOTH CAVE.

Special Telegram.

BARDSTOWN, Ky,. July 7.—Charles W. Gray, president of the Chicago Automobile Club arrived with his family, accompanied by others of the tourist party, at Mammoth Cave at 11 o'clock Sunday night and left at 8 o'clock this morning on the return trip. These were the first automobiles ever to reach the cave.

Manufacture of Steel Tubes in Germany.

The manufacture of tubes and pipes from iron, steel, copper, and other metals and alloys, although of comparatively recent date, is one of the most extensive and highly developed industries of its class in Germany, writes U. S. Consul-General F. H. Mason. There were in operation at the close of 1900 seventy-seven manufactories of metallic tubing, some of which —as, for example, Predboeuf et Cie., the Mannesröhrenwerke, and the Röhrenindustrie, all at Düsseldorf—are large establishments with ample resources and equipped with every facility for cheap production on a large scale.

The Mannesmann process for rolling seamless tubes and the Ehrhardt system by which seamless pipes are drawn by forcing a mandrel under hydraulic pressure through a block of metal are both German inventions which have been developed and worked with notable success in this country, while Larson's Swedish process for making steel tubes, the Murphy process, and the Robertson and Elmore patents for making copper and brass tubes are all employed in Germany under the most advantageous circumstances.

The import duty on wrought iron and steel tubing is 5 marks ($1.19) per 100 kilograms (220 pounds) under the tariff laws of January, 1896, now in force, and this rate is advanced in the tariff of December 25, 1902, to 8 marks ($1.90) for rough and 15 marks ($3.57) per 100 kilograms for polished or otherwise finished tubing. If the wall of the finished tube is less than 2 millimeters in thickness, the rate under the new tariff will be advanced to 20 marks ($4.76) per 100 kilograms.

Germany has both an import and an export trade in metallic tubing. The imports in that class during the eleven months ended November 30, 1902, amounted to 9,916 tons, of which 6,396 tons, or about two-thirds of the whole amount, came from the United States, the remaining third being derived from Sweden, Austria, Great Britain and Belgium. To what special grade, size or category these imported tubes belonged, or why they should have been imported in face of the vast home production and large export of German-made tubing can only be conjectured; there is nothing in the official statistics to explain it. But during the same eleven months of 1902, Germany exported iron and steel tubing to the amount of 50,505 tons—more than five times the imports in the same class —which were distributed to nearly every country of Europe and South America.

His Automobile Ride Spoiled.

Special Correspondence.

MILWAUKEE, July 6.—Homer F. Warkenstein, who claims to live in Chicago, is in jail here on the charge of attempting to pass a forged check for $750 on a Milwaukee automobile dealer. He had written a letter to a sweetheart in Chicago, telling her he would arrive there soon in a fine auto. On the day he wrote the letter he offered George A. Crane, a local dealer in motor vehicles, a check for $750 for a machine. With the machine in his possession he would have had a good chance of speeding beyond the reach of the officers, but the dealer became suspicious, and asked Warkenstein to call again, which he did, only to be promptly arrested and confronted with the charge.

Tarred Roads in America.

"Dustfree roads and many of them" is the new luxury that the civilized world has learned to demand. McAdam's road-building system, good in its day, no longer corresponds to the modern standard of living. Expensive in prime cost and more so in repairs, burdensome on the watchfulness and prompt action it exacts of road supervisors, and even at its best extremely dusty and unhygienic the macadamized or Telford road has been shown in its true color through the advent of the dust-raising automobile, and suddenly the world at large was obliged to realize that—automobiles or no automobiles—dust was an intolerable nuisance which should be abolished. And in this train of thought, which extended far beyond automobile circles, it was only a short step to demand that also mud and excessive cost of road building and road maintenance should be avoided.

TOUGH AND NOT BRITTLE MATERIAL.

"High roads should be made out of tough and not of brittle material which is continually ground into new dust and churned into new mud by hoofs of horses and heavily laden wagon wheels." In such or similar terms the new conviction, working its way to the surface of public opinion, first demanded asphalt or wood pavements in cities and, spite of their high cost, they were laid so generally as to bear evidence to the strength of the demand which backed them. The slipperiness of asphalt, the short life of wooden blocks and numerous other minor considerations have reduced the vogue of these materials, without in the least diminishing the pressure of the common opinion which had for a time sustained them. On the contrary, suitable road surfaces were required not only for city streets but far out in the country, connecting the towns. The public had got somewhat impatient having only the railroads to fall back upon, and being otherwise penned up in their respective communities through the wretchedness of high roads. The automobile revealed the strength of this impatience, which began to know itself after the bicycle had created a new taste for the country. Thousands of miles of new macadamized roads were built under the stimulus of the mere sentiment for "good roads," before the sentiment had crystallized into mature ideas as to the ways and means for suiting the acts to the purpose. The new roads were as dusty as the old ones. Financial provisions for taking care of repairs were usually neglected.

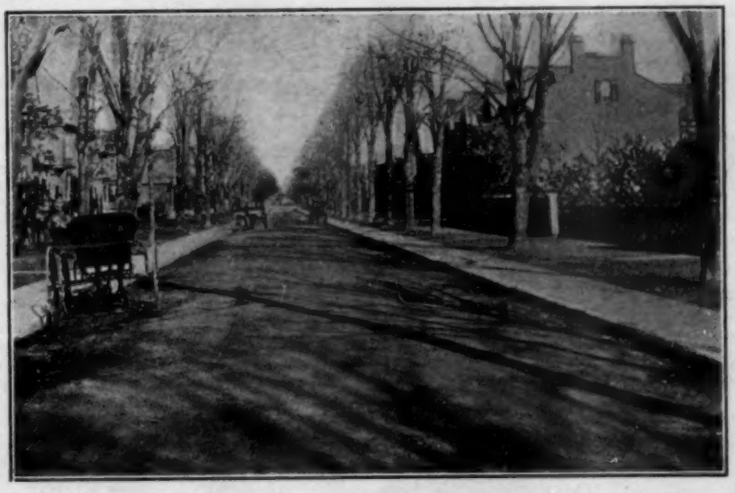
By slow degrees the ruling intellects of progressive communities awoke to a realizing sense of something being amiss in the whole movement for good roads and good streets. A few stretches of suitable surface would not answer. There must be good roads all over, millions of miles of them, or the whole thing would be a makeshift, and makeshift luxuries are an anomaly. The question was of a national, or at least a State luxury, and not a mere local necessity. The radius of travel had lengthened, with the automobile in common use. The radius of vision with it. But on a large national scale the high cost of asphalt, wooden blocks, vitrified brick was prohibitive. Macadam cost as much in the long run, and then the dust! The dust cloud hovered over the problem as an impenetrable fog that cautioned conservatism and clogged initiative.

FOUNDATION COURSE FOR TAR MACADAM ROADWAY.

OILING AND TARRING MOVEMENT.

Then the oiling and tarring movement was slowly evolved out of the darkness. No dust, no mud, cheap roads for the multitude, a non-slipping surface, infrequent and inexpensive repairs! All this it seemed to promise, and the promise has not yet been broken, though it has been qualified.

THE AUTOMOBILE published an extensive article, in the autumn of 1902, on the oiling experiments in San Bernardino county, California, and subsequently several editorial articles on the road question in general, and an account in the issue of May 23 last, dealing with the numerous recent European tests of "Tar as a Road Material." The European experiments, flattering as were the results for the enterprise of their instigator, Dr. Guglielminetti, were not conclusive from all points of view, even apart from the fact that the time elapsed since their commencement has been insufficient for testing the durability of the methods employed. The price of labor and of tar in southern Europe—the scene of the most important tests—differ so largely from American conditions as to exclude an economical comparison. Moreover, the tests included tar treatment of roads already built, but not the use of tar in new construction of a road surface. Undertaken solely to abate the dust and mud evils the tests showed incidentally that the durability of the old macadam was much increased by the tar coating, but also that it was difficult to obtain the most favorable conditions of applying this coating to an old road saturated with moisture and permeated with



FINISHED TAR MACADAM ROADWAY IN HAMILTON, ONTARIO.

dust. In this country where the roads that are required are mostly yet unbuilt, the problem is essentially different, and it is therefore a happy circumstance that new reports have come to hand from nearer home and supplementing the information from Europe in a very satisfactory manner.

EXPERIMENTS IN CANADA.

The American consul, James L. Shepard, at Hamilton, Ontario, supplies these interesting details relating to the use of coal tar in new-building of roads on this continent. During the six years of his official residence in the locality mentioned he has carefully watched the progress made in the new method, and he finds that each year has shown greater skill and better results. As usual the way to the public improvements was pointed out through private energy and enterprise, but it is only the work done at public cost and of comparatively recent date which is included in the city engineer's report given hereafter. The private experiments, on which the public work was based, date back 22 years when the gas company of Hamilton first laid a part of a street with tar-macadam. This stretch was used by teamsters in hauling heavy loads of merchandise from the railway. The manner of doing the work was crude in comparison with later methods, and little labor or money has been expended in keeping it in repair; yet that street is to-day, writes the consul, in good condition. Two blocks on a business street, also much used for heavy teaming, were laid by the gas company 10 or 12 years ago, and these two blocks have recently been resurfaced at a cost of 25 cents per square yard, without any other expense intervening. The first city work was begun four years ago when a block in the business center was selected for an experiment with the newer methods of combining stone and tar in road work. Spite of very hard usage that block is now reported almost as smooth and in as good condition as when first made. The cost of construction was 68 cents per square yard, but since that time the cost of labor has advanced from 16 to 20 cents per hour with a corresponding decrease in the present cost of similar work.

U. S. CONSUL'S IMPRESSIONS.

Summing up his impressions Mr. Shepard writes:

"The asphalt pavements put down in this city eight years ago cost more than twice as much as tar macadam to construct and have involved almost constant expense to keep in repair. Judging from experience, and with the latest methods of combining the material, a tar-macadam road will give good service for at least ten years, and it can then be resurfaced at a cost not exceeding 25 cents per square yard. The tar-macadam road is almost as noiseless as asphalt, and is easier on horses, with less jar and no danger from slipping in rainy weather. Another advantage is that it is almost dustless."

The following table shows the cost per square yard of a 10-inch roadbed of tar-macadam and also gives a rapid preliminary idea of the method of construction, as followed out by the board of works at Hamilton:

COST OF TAR-MACADAM CITY ROADBED.

6-inch course bottom stone	$0.112
4-inch course broken stone	.116
2.52 gallons tar per square yard	.197
Tarred gravel and stone dust	.082
Rolling	.016
Labor	.496
Underdraining per square yard	.06
Total	$1.079

5in Stone Curb
To crown on 30' Roadway
1½ Ring gravel & chippings mixed with Tar
2" Tarred stone (space thro a 2" ring
3" " " 4"
6" Telford foundation
Note: Depths of material are given before rolling
Concrete

DIAGRAM WITH SPECIFICATIONS FOR FOUNDATION WORK OF ROADWAY TO BE TREATED WITH TAR.

This price is for work in light soil and excavating only about 10 inches deep. In hard and uneven ground, from 10 to 20 cents a yard would have to be added for extra labor.

From the rules for the work to which the cost of $1.07 to $1.37 per yard applies the following will be found of general interest:

WORK OF CONSTRUCTION SKETCHED.

In the excavation care should be taken to make the subgrade conform to lines of finished surface of the roadbed. Thoroughly roll the subgrade and fill all depressions. In light, loamy soil, from 1 to 1½ inches should be allowed in excavating for compression by the roller. To improve the roadbed, it should be underdrained on each side at curb with 3-inch tile, at a depth of 3 feet at highest point, with a fall of 6 inches in 100 feet. These drains will keep the bottom of a 30-foot roadway perfectly dry.

The bottom course, or stone foundation, should be 6 inches in depth, of flat stone, varying from 6 to 12 inches, laid roughly by hand, after which stones of a smaller size are put on top, so that all the larger voids in the foundation stones are filled. This is then well rolled. Then come two layers of sharp-angled tarred stone—the bottom layer of stone that will pass through a 2½-inch ring and the top layer that will pass through a 2-inch ring. Spread a light coat of tarred gravel over the lower course of tarred stone before putting on the second layer of stone. Each layer should be thoroughly smoothed down with a heavy steam roller. This packs the roadway and makes it solid.

After smoothing surface of top layer, a top dressing, composed of two-thirds parts of fine sharp gravel and one-third part stone dust, mixed with 25 gallons of tar per cubic yard, should be carefully spread over the surface. Then spread fine stone dust very evenly over the top and roll with heavy roller. Pound the ditches and irregular places that can not be reached by roller with hand pounders.

A more detailed account will be found in the city engineer's report which is submitted by Consul Shepard. It is herewith reproduced in full:

ENGINEER'S REPORT.

The City of Hamilton having laid about 8 miles of cedar-block pavement in 1885, and this pavement having rapidly deteriorated, until in the year 1899 it became impossible to draw an ordinary load over it with safety, it was decided to replace the whole of this pavement with tar macadam.

During the years 1899, 1900, and 1901, 8.68 miles of tar macadam was laid at a total cost of $145,061.

The method of construction may be briefly stated as follows, viz.:

***Subgrade.*—The cedar blocks composing the old pavement were removed. The blocks being 10 inches deep, it was necessary to remove 2 inches of the sand foundation underneath the blocks to allow of the full depth of 12 inches of tar macadam to be placed, so as to leave the curb in the same relative position with the finished surface of the roadway as before.**

***Rolling subgrade.*—The subgrade was then rolled with a 15-ton roller, and any soft spots revealed were filled up and rolled until the whole surface had been worked to the proper grade and cross section, care being taken to keep the subgrade, as also each succeeding layer of materials, parallel with the finished cross section of the roadway.**

***Stone foundation.*—The bottom course of stone foundation, 6 inches in depth, was next put in place. This consisted of stone varying from 6 inches to 12 inches laid roughly by hand on their natural or flat beds, after which stones of a smaller size were put on top and broken roughly in place, so that all the larger voids in the foundation stones were filled. This course was then rolled similar to the subgrade, care being taken, as before stated, to keep the cross section true.**

***Tarred stone.*—The broken stone was now brought to the work and the process of tar-**

ring was gone through with as follows: Tar kettles, in which the tar was kept at the workable temperature and consistency, were placed conveniently to mixing boards similar to those used in mixing concrete.

Tarring.—The stone to be tarred was placed on the board and the tar applied to the stone by scattering with a swinging motion from a dipper fastened to a wooden handle of a convenient length to reach well down in the tar kettle.

After the first application of tar, the pile of stone was turned over twice by shoveling, the shovels being kept hot to facilitate the process. The operation of tarring was again gone through with alternate turnings of the mass until no bare spots could be seen on the stones, or, in other words, until each stone had a coating of tar.

Stone to be dry.—To give the best results, the broken stone must be entirely free from moisture before being tarred. As soon as the stone and tar had been thoroughly incorporated it was wheeled onto the roadway and raked into conformity with the cross section.

Rolling tarred stone.—It was found that if the rolling of this course were left for two or three days after being placed on the road, it required more rolling to compress and did not bind so firmly as when rolled soon after being laid, or as soon as a stretch of sufficient length to operate the roller economically had been laid. The stone used in this course was broken to a size to pass through a 2½-inch ring and was laid to a depth of 5 inches, as nearly as possible, before rolling.

Top course.—The third or top course was composed of gravel screened through a ¾-inch mesh and mixed with tar about 20 gallons of tar being used to 1 cubic yard of gravel. This was mixed in an asphalt mixer and brought to the work hot, scattered over the roadway, and raked in very carefully, the utmost care being taken to get the surface to true grade and section, none but the most experienced men being employed in this portion of the work. The whole was then rolled, after which screenings from the crusher were scattered broadcast over the surface to be worked in by traffic, the object being to harden the surface of the pavement and to give it a more pleasing color than the dead black of the tar.

Curbing.—The curbing constructed with this pavement was composed of Portland-cement concrete, according to the section shown. The usual method of construction was reversed, inasmuch as the curbing was laid after the pavement had been constructed, the reason being that it was found to be much easier to set up the molds for the curb, the pavement being used to place the edges of the mold boards upon. As soon as the curb had set, the molds were taken off and the ragged edges between the roadway and curb filled in with concrete and finished with cement mortar.

Cement walks along tar roads.—The method of constructing sidewalks outside the tree line and immediately alongside the traveled road has been employed here very extensively, and wherever this is done the curb is combined with the sidewalk, as shown. Whenever possible, the tar macadam has been laid before the sidewalk, so that the walk might not be disfigured with tar. This class of pavement has proved to be particularly well adapted for residential streets and streets where the traffic is spread evenly over the whole surface, but it is not satisfactory alongside street railway tracks where the traffic is confined to a narrow space on each side of the tracks. In several stretches put down here in 1899 along the street-railway tracks the pavement shows distinctly the marks of excessive wear.

Repairs.—No repairs have as yet been made on any of the pavements laid within the last three years. Some pavement, similar in construction, put down by the local gas company eight or ten years ago has been recently resurfaced at a cost of 25 cents per square yard, no repairs being done up to that time. The advantages of this class of pavement may be summed up as follows: Economy in construction, the average price for 1901, with labor at 18 cents per hour, being $1.06 per square yard; good foothold for horses; and absence of dust—therefore economy in cleaning and sprinkling.

Flood.—As an illustration of how this pavement will withstand disintegration. I may state that on the night of April 29, 1901, during an unprecedented snow and rain storm, a large drain 8 by 2½ feet by 5 miles, situated on the plateau above the city and immediately at the upper end of the streets recently paved with tar macadam, choked, the whole volume of water coming over the mountain and rushing down over the pavement from 12 to 18 inches deep for twelve hours. The grade of the street is 3.4 per 100, so that the velocity was such as to carry with it large bowlders and debris which had been dislodged from the side of the mountain in its descent.

The upper portion of the street was composed of plain macadam, the materials of which were all swept away, leaving ruts and holes in some cases 2 to 3 feet deep.

The tar macadam immediately adjoining this was practically unharmed, excepting alongside the curb where the surface coating was worn off in spots.

The method of tarring stone followed in Ontario is the old-fashioned way of turning the stone over on a sweat board, as in mixing concrete by hand. A good, strong asphalt mixer, with heaters run in connection with the crushers, would reduce the cost of labor and cover the stone better, with about one-third less tar. The tar to be used should contain not less than 60 per cent. patch and be practically free from water and retort dust.

FURTHER EXPERIMENTS NEEDED.

When considering the important facts given in the preceding account in their relation to the possibilities of improving country roads by similar methods, it will probably not escape those interested, that the good results obtained by mere surface treatment in Europe strongly suggest the advisability of undertaking experiments to ascertain how much thinner, and less expensive, the stone crust of macadamized country roads may safely be made when tar is used in the original construction than when the packing of the stone is alone to be relied upon for shedding water. When it is remembered that the chief virtue of macadam as a road surface depends upon its preventing water from soaking through and softening the dirt bed on which it lies—a point most strongly insisted upon by Macadam though frequently forgotten by others—it may not be too sanguine to expect that four to six inches of tarred stone will prove as durable as ten inches of stone merely packed. And the saving implied would open thousands of miles for needed improvement.

COSTUMES OFFERED IN NEW YORK

How to be Hideous.

A glance at the accompanying engravings would lead the reader to suppose that the "white caps" of the middle west had adopted the electric automobile as the vehicle in which they could go swiftly and silently to carry out their deeds of vengeance. It is nothing more or less, however, than an example of the delightful inconsistency of woman, who will adopt every device of fashion that makes for attractiveness when afoot, but will just as readily go to the opposite extreme when motoring. The young woman at the tiller in the photographs wears one of the fashionable pongee cloaks, with saucy cap and transparent silk gauze veil. Her amiability is apparent, or else the fair motorist would not go driving with her death's head companion. The latter in one view wears a face mask of white material with a pongee dust cloak and hood, and in the other, a new style of opaque mask covering the face and neck, with holes for the eyes fitted with goggles. Such apparel is said to be in demand at New York outfitters, and is no doubt a very appropriate design for outings in "Devil Wagons" or "Hell Carts," but can hardly be considered suitable for motoring in the peaceful and gentle electric vehicle.

DEATH MASK AND VEIL HEAD GEAR.

A Discussion of the Gasoline Runabout for the Novice.—II.

BY A. D. RIVER.

Efficient water circulation is no less important than proper lubrication. Always use soft water whenever possible; hard water gradually forms a deposit on the inside of the tubes, which is especially objectionable because it soon reduces the efficiency of the radiator. In filling the tank always use a large filtering funnel—the filter is merely a piece of wire gauze of fine mesh, soldered inside. Any tinsmith can make one if it is not included in the original vehicle equipment. A large funnel should be used to prevent water from splashing over the motor and other mechanism.

WHEN THE MACHINE IS NEW.

When the machine is new, and after filling the water tank for the first time, go over the circulating system very carefully to ascertain if there are any leaks; if so repair them permanently before starting out. A temporary repair on the road is sometimes a necessity, but to avoid future trouble always make permanent repairs whenever possible. The smallest leak may develop at any time into a serious difficulty—especially if repair facilities are far away.

Always keep the water tank well filled; this is very important.

FILLING THE GASOLINE TANK.

Gasoline of low specific gravity should be avoided; use fuel of at least 76 degrees standard hydrometer test whenever procurable; the motor will then develop its full power at all times, and the carbureter will not require the frequent adjusting that would be necessary if gasoline of various degrees of density were used.

In filling the gasoline tank use a filtering funnel similar to the water funnel previously described, but do not use the same one. Although this precaution is frequently neglected by the careless operator far more satisfactory results are assured if it is always observed. If water gets into the gasoline tank it sinks to the bottom, being heavier, and soon finds its way into the carbureter, where it lodges—a hidden enemy to a proper gas mixture. Keep the gasoline tank well filled at all times.

Just a word of caution about handling gasoline. This highly volatile fluid should be stored in a perfectly tight can, so that evaporation is impossible; in this way safety is assured. The liquid itself is not explosive, but as it evaporates and mixes with the air a very explosive gas is produced which quickly permeates the atmosphere, becoming a source of danger that must be recognized and guarded against. Great care should, therefore, be taken that no flame or fire of any kind is burning in the vicinity when the gasoline tank is being filled. Smoking, of course, should be absolutely prohibited. After the tank is filled screw the filler cap firmly in place.

STARTING THE MOTOR.

It is taken for granted that the electric ignition system of a new automobile is in perfect condition, so having filled the water and gasoline tanks, the vehicle is ready for its trial run.

The clutch lever should, of course, be in its neutral position, and if the brake is not applied, it may be readily set with the hand, the ratchet device with which it is equipped holding it where set.

In starting be sure to first move the spark-control lever back, so that ignition will take place at its latest point in the stroke; then turn on the electric circuit switch, which is frequently placed on the seat board beneath the leather fall. If the carbureter is of the throttle control type, operated by a foot button or small hand lever, it should be set to admit the full charge of gas. Now "prime the carbureter" by pressing down a few times on the float-pin, which projects above the float chamber. This action allows the initial charge of gasoline to flow into the vaporizing chamber; when the motor is running this operation is automatic. Next grasp the starting handle firmly and turn over until the compression is reached, feeling the way, as it were, so that the final pull over the compression will come on the upward movement of the handle. This is not absolutely necessary, but it is a good precautionary measure, because, in the event of a possible premature explosion, the starting handle would merely be pulled out of the hand, while if the crank was on its downward course when such premature ignition took place serious personal injury might result.

If the motor starts with the first turn over the compression it is evident that everything is in good operating condition; if it refuses to start try again, not forgetting that it may be necessary to prime the carbureter once more. After two or three unsuccessful attempts it is useless to continue "cranking"; something is evidently wrong, and a little study will accomplish more than a lot of wasted energy. Probable troubles and remedying them will be considered in another chapter; for the present it will be understood that starting is effected without difficulty. If the motor runs slowly or seems about to stop the spark should be very gradually advanced, when the speed will pick up at once. If the spark is advanced too quickly a premature explosion will probably bring the motor to a sudden stop. The motor should not be permitted to race when the vehicle is standing, but an even and moderate speed should be maintained by proper use of the lever or foot button throttle and the gas mixture lever, and the spark control device.

Having mastered the art of starting the motor, the novice is now ready to take his initial automobile trip.

Motoring in Savannah.

Automobilism is of much slower growth in the South than in the North and West, but in spots a very considerable amount of interest is being manifested in the new form of locomotion. One of the busy places is a salesroom and garage in Savannah, Ga., shown in the accompanying snapshot. This establishment is owned by T. A. Brayson, and is equipped in quite modern style. The salesroom has a marble floor and steel ceiling, and the sides are finished in cherry wood with mirrors. There are some very good roads leading out of Savannah in different directions for a distance of about ten miles, and several of them have been connected by cross roads, so that there is probably fully 100 miles of excellent motor roads in the vicinity of the city. The roads are made of fine shells and Augusta gravel, which gives a very smooth surface, and they are sufficiently porous to drain quickly after showers. The roads run through very picturesque country, and with the development of interest in the motor car Savannah seems likely to be soon in advance of many other southern citites in this respect.

MODERN GARAGE IN SAVANNAH, GA.

His Explanation.

She—"I read the other day that with a horse and buggy trotting at seven miles an hour alongside of a touring car making twenty miles an hour the motor car could be stopped first in case of accident."

He—"Let's see—how was that?"

She repeated the statement literally.

He—"Oh—ah—ye-es—why, yes; you see the motor car would be so far ahead it would have to stop first!"

A Growing Factor in American Life.

An automobile is not always the engine of destruction that excited writers in the daily press would have the public believe. This thing of iron, steel, brass, copper, tin, aluminum, platinum, nickel, wood and rubber; full of electricity, steam, water, oil, compressed gas, explosions and exhausts, is not always busy breaking the laws of the land. Automobiles frequently have been known to serve the ends of justice, bringing criminals and lesser evil-doers to punishment; they have served the contented farmer in his fields, and they have served the patient public when striking cabbies have made life a burden to the hurried business man.

Leaving the more practical things of life, and entering the realms over which artful little Cupid holds full sway, you will find the motor car there before you. The elopemobile is becoming a factor in many well regulated families. Only recently the daily papers were filled with stories telling how Capt. Chas. Senter, an instructor at the Nyack, N. Y., military academy, stole pretty 18 year old Martha Fleming from the gloomy confines of a convent in Roxbury, Mass., and hurriedly assisting her into his waiting automobile, drove her at break-neck speed to the ready minister at Jamaica Plain, the pump pumping as it never pumped before, and the steam gauge dancing and gauging away, as they sped toward the modern Gretna Green.

In considering this subject of motor cars the mind must act quickly. The scene shifts to Morristown, N. J., where a large "red devil" recently aided a father from Philadelphia in getting possession of his little curly headed 5-year old daughter, previously held a prisoner at the home of her grandmother. The eager parent drove up to the house in an automobile, and while the folk stood around, wondering, he grabbed the child and jumped into his machine. Pulling the lever with a sudden jerk, the father and daughter were rushed down the road and away in a cloud of dust, before the Morristown folk knew what had happened to disturb the usual peaceful atmosphere of the Jersey suburb.

THE TWENTIETH CENTURY LOCHINVAR.

Midnight prowlers are not so familiar with these modern vehicles as are the habitues of Broadway, so when Wall Street broker W. W. Caswell whizzed around a bend of the drive at his home, in White Plains, N. Y., the other night, on his way from the Westchester Country Club, in a big Panhard, his sudden presence held spell-bound two skulking men who were hiding beneath a tree. Pretending to not notice them, Mr. Caswell drove up to the house, hurriedly secured a revolver, and ordered his chauffeur to charge the men in hiding. The great glare of the acetylene lamps blinded the intruders, but clearly exposed

A NEW LIGHT ON HOLDUPS.

them to the view of the intrepid broker. Just as he reached them he ordered the car stopped, and jumping out, ran to the men with a peremptory "Hold up your hands." At the point of the revolver they were ordered into the car, and then quick ly driven to the White Plains police station. Under the tree where the men had been in hiding, two masks and a "black-jack" were found.

Not only is the automobile a terror to evil-doers of all classes, but it also strikes fear into the hearts of surly beasts. A great bull has long held the little Illinois village of Mahomet in constant dread, but now the citizens pass him by unnoticed. The ugly bull has been cowed by an automobile. A few weeks ago J. S. Philippi started across his farm in an automobile, the road leading him down a lane where the fearsome bull was grazing. Suddenly and with an angry snort the beast lowered his head and started for the car. Mr. Philippi "let her out" and executing a sudden flank movement, succeeded in getting at the harmless end of the now infuriated animal. Just then—bump, and down went the bull. Rear end collisions were now rapidly succeeding each other, accompanied by the toot of the auto horn and the frantic bellowing of the bull. The

THE SPANISH MATADOR OUTDONE.

neighbors came from far and near to see the unwonted sight, and the eyes of the good people of Mahomet bulged out with wonder because the bull was by that time and ever after as peaceful as a kitten. Since this true story was first read in the papers automobile stocks are said to have been "bullish."

An automobile, proving so efficient in taming a bull, should naturally assist materially in subjugating Boers. It is therefore not surprising to find that a light steam runabout played its part on the veldt, during the late war in South Africa. The machine was used by British officers in traveling from camp to camp, and water for many a hot Scotch was drawn from the cock at the bottom of the water glass. At night the rear wheels were jacked up and belted to a dynamo, which supplied current to operate a powerful searchlight. This is not the only instance of an automobile playing a more or less important government service.

The New York Post Office owns an automobile which recently has been given attention during the early investigations of the Post Office department. It developed that this machine, which is a handsome electric cab, is at one and the same time satisfactory and unsatisfactory, fast and slow, reliable and unreliable. It seems to depend entirely on the point of view. Postmaster Van Cott says that when he starts anywhere in his automobile it is always a question whether he will arrive at his destination via a trolley car or the "L." Walter Evans, the postmaster's chauffeur, says the machine is a good one and has done very hard work constantly for the last four months. This automobile is very elaborate and is said to have cost the government $3,000.

Perhaps the most peculiar use to which a motor vehicle has been put, is that introduced by Frank Young, of Kaneville, Ill. He says he uses his machine for hunting ground hogs. "We attach a long hose to a stop valve, and stick the other end of the hose in a burrow, first driving the

HOT TIME IN GROUNDHOG TOWN.

machine about 15 ft. away. Then while I turn the steam on, father stands at the other end of the burrow with his gun; the gophers soon come out in a great hurry, and father picks 'em off." While this is a novel method of hunting ground hogs it is not yet assured that every ground hog hunter will be provided with an automobile.

In Toledo, Ohio, last fall the local lodge of Elks held a carnival, preceding it with a sale of 10-cent tickets, the lucky number being good for a beautiful automobile. On the final day the tickets were collected, but strange to say the winning number was not returned; a week passed and then the men in charge of the event announced the winning ticket, hoping that it would be finally discovered. In a very few minutes a butcher claimed the vehicle, showing as proof a note book in which the right number was, surely enough, written. He said that he originally held the right ticket, but fearing that he might lose it, he wrote the number in his note book. Because he had not presented his evidence during the week that the number was sought, and before it was announced, those in charge refused to recognize the butcher's claim. The ticket was never found.

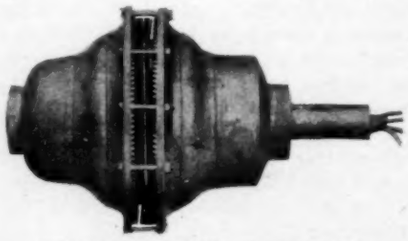
Not only have motor vehicles assumed important roles in many peculiar directions, but they have also figured prominently in social functions of note. The most important recent social event in Cleveland, Ohio, was the marriage of Senator Mark Hanna's daughter to Joseph M. McCormick, of Chicago, on which occasion the automobile again asserted itself. Mr. McCormick's college friends, swearing to give him an interesting send off for the wedding journey, had arranged to follow the couple to the train in carriages. After the wedding reception the bride and groom hurried into a carriage, and drove rapidly away, pursued by a great number of other carriages containing their friends. A short distance from the Hanna residence, the bridal couple jumped from their carriage into a waiting automobile of great power, and before the pursuers were within calling distance, the car disappeared down the road in a cloud of dust. The big machine made record breaking time to the nearby village of Berea, where a special train was in waiting.

Surely the automobile, still in its infancy, has already reached the dignity of an important factor in modern life. And the old reliable horse, at once the drudge of his owner and his master, is being gradually relieved from his years of slavery. The day of his emancipation is at hand, and the time is coming when he will be as free as the wind, to wander in Nature's green fields and finally to end up in a tight fitting pigskin, as pure imported frankfurter. If the horse, like the fabled Centaur, had only a man's head and thinking powers how happy he would be at the prospect of a life of ease and abundant feed, with a place of honor at (or rather on) the dining table of his master at the end.

The "Gyroscope" Hub Motor

An ingenious and apparently successful hub motor for electric vehicles is the subject of patents granted to A. B. Holson, of Chicago, and illustrated in the accompanying engravings. In brief, the object aimed at is to overcome the axial thrust of the bevel gearing used, and this is done by mounting similar bevel pinions at opposite ends of the armature shaft, and meshing these with opposing gears connected together. To accomplish this the armature shaft is set slightly at an angle as the illustrations show. The motor frame and field magnets remain stationary, being secured to the axle, and the hub revolves, apparently on ball end bearings, around the motor. Thus the bevel pinions exert no end thrust, and the reaction of the large gears is likewise mostly balanced, leaving only the lateral reaction of the pinions to be taken care of by the armature shaft bearings.

Some tests of a one horse power motor of this type by Prof. Fred A. Rogers, of the Lewis Institute, Chicago, showed a loss of only 1 per cent. in the bevel gears up to 16 per cent. overload. From this point the loss increased up to 14 per cent.



HOLSON ELECTRIC HUB MOTOR.

at 68 per cent. overload, owing, apparently, to the fact that the bevel gears were cut for true perpendicular axes. It would, of course, be quite possible to modify the teeth to suit the slight angle of the armature shaft.

This motor is called the "Gyroscope" motor by its manufacturer, M. B. Church, of Grand Rapids, Mich.

The value of the automobile for carrying mail over rural routes was demonstrated by a practical test at Union City, Ind., recently. In two hours the vehicle covered a distance of 28 miles and made 94 stops. With a horse and wagon it has required about seven horses to perform the same work.

THE GYROSCOPE ELECTRIC VEHICLE MOTOR—COMPLETE IN THREE PARTS.

One side of Cog Rack in Hub Attached to Wheel. Motor Wired Showing Pinions. Outer Half of Hub.

The Auto Traction Company has started an automobile coach line in Grafton, W. Va., operated on a regular schedule of rates.

Baron de Crawhez in a Panhard Wins the Circuit des Ardennes.

Special Correspondence.

BRUSSELS, June 24.—The croakers have been silenced. The Circuit des Ardennes has been carried out this year without any fatalities. There were many failures of a mechanical nature, and in at least two instances mechanicians were injured by being thrown off their cars when making sharp corners; otherwise the races have been remarkably free from mishaps. It has been a disappointment, however, that with cars of much greater horsepower than last year there has been practically no corresponding gain in speed, certainly none in reliability.

The racing extended over Monday and Tuesday, the first day being given up to the heavy and light car contests, and the second to voiturettes and motor cycles.

The course as you know is a triangular loop, starting at the little Belgian town of Bastogne and touching at Longlier, Habay-la-Neuve, and Martelange on the way to the starting point again. The distance is about 53 miles, and around this course the cars pass six times making a race of 318 miles, or rather less than the Gordon Bennett in length.

There were more than fifty entries for the race for heavy cars which took place in the first half of Monday, the start being made from Bastogne at 3 A. M. Only twenty-cars showed up, however, and of these eleven completed the circuit. The cars and their drivers and the official times follow:

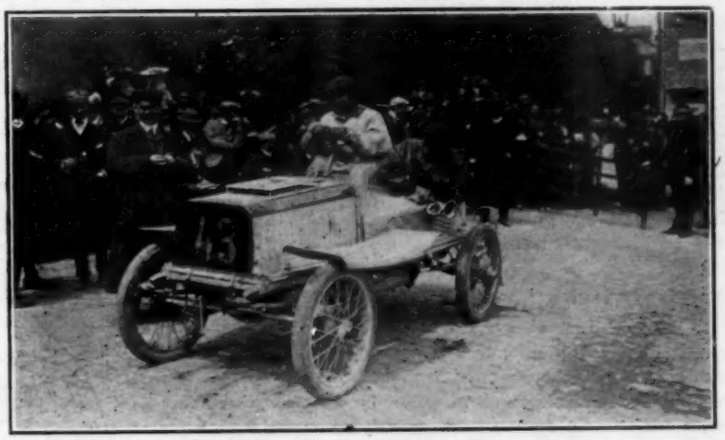
THOSE WHO FINISHED.

Driver.	Automobile.	Time.
Baron de Crawhez	Panhard	5::52:: 7:3-5
Girardot	C. G. V.	6::12::11:4-5
De Brou	De Dietrich	6::24::39:1-5
Le Blon	Gardner-Serpollet	6::31::3
Beconnais	Darracq	6::48:: 5
Coppee	Germain	6::57::14:3-5
Voight	C. G. V.	7:: 4::40
Guders	Pipe	7::10::17:3-5
Hautvast	Pipe	8::26::56:4-5
Sidney Girling	Wolseley, (English)	11::15::54
Van de Poele	Pipe	11::25::48

The winner's time is little over one minute faster than the winner's performance last year, when Jarrott covered the course in 5: 53: 39 3-5. In that race you will recall Gabriel, this year's Paris-Madrid winner, came in second and W. K. Vanderbilt, Jr., third. This year the latter started also and made the first round in the good time of 58: 16 for the 53 miles. Soon afterward one of the cylinders in his Mors car cracked and he was compelled to withdraw.

Baron de Crawhez who won the race was first to start in a 70-horsepower Panhard, and the others were sent off at one minute intervals. His time for the first circuit of the course was 56: 40. He was closely followed by Vanderbilt, Girardot and Jarrott in the order named. The latter popular English driver had bad luck with his De Dietrich car, the tires of which collapsed so frequently that he was put out of the race. The big Gobron-Brillie cars also experienced severe tire troubles.

GIRARDOT TAKING A CORNER AT BASTOGNE.



JOURNU IN A DE DION, WAITING FOR WORD TO GO.

In the 1902 race Baron de Crawhez made some, then, remarkable time, covering the first 100 kilometers in 1: 2: 35, or at the rate of 64 miles an hour. He was put out of that race by collision. His time for the entire course this year was nearly 54 miles an hour. He made a splendid run, stopping only for fuel and making each complete round with almost clockwork regularity. He won the gold medal and also the Bastogne cup for the first time. This cup becomes the property of any driver winning it three times.

On the same day the race for light cars drew thirteen competitors, of whom seven finished as in the accompanying table.

The class embraced cars weighing from at speeds above twenty miles an hour to

(Continued on page 36)

DE CRAWHEZ RECEIVING CONGRATULATIONS AFTER THE RACE

Ten Miles Under Ten Minutes on a Mile Dirt Track.

Marvelous Driving by Barney Oldfield at the Columbus Races —He Goes One Mile in 56 2-5 Seconds and Ten Miles in 9:54 4-5, Breaking All Records.

Special Correspondence.

COLUMBUS, O., July 4.—Nearly 10,000 people gathered to-day to see the first annual race meet held by the Columbus Automobile Club at the Driving Park. On the fastest driving course in the world Barney Oldfield, the fastest automobile driver in America, beat all track records with his Ford-Cooper machine. He not only broke his own world's records for one and five miles, but also Alexander Winton's world's record for ten miles. The former records held by him were 59 3-5 seconds for a mile, and 5:04 2-5 seconds for 5 miles, made at Indianapolis on June 20. To-day he made the five miles in 5:01, and ten miles in 9:54 4-5, breaking the ten-mile record made by Alexander Winton.

Oldfield appeared in but two events—a five-mile and a ten-mile exhibition. He was scheduled to give a one-mile exhibition but omitted it to save his machine. And it was fortunate that he did so as one of his tires was just ready to burst at the end of the ten-mile event, and going at the speed he did, would in all probability have resulted in a serious accident.

TWO RECORDS IN FIRST TRIAL.

Two events had been pulled off when Barney, in a flaming red coat and bareheaded, swung onto the track at the north gate in his "Red Devil," rounded the turn, and tore diagonally up the home stretch toward the outside fence, with a rush like a giant skyrocket. A mighty cheer arose from the crowd as he dashed by, just grazing the fence and rounded the first turn, throwing a cloud of dust to the outside of the course and into the faces of the spectators leaning over the fence. He flew down the back stretch at an appalling pace. Soon his machine was seen to slacken its pace, but he came on and passed the stand again and again. But he was going slower and slower, and it was evident something was wrong. He stopped at the north gate, where the trouble was righted quickly and again he came down the home stretch, this time to break a world's record.

The crowd watched in breathless wonder, expecting to see him dashed to death. He gave the signal, and shot by, raising a long wave of dust. He swung around the south turn, shot down the back stretch and fairly tore up the track on the north turn. There was a sudden but smooth drop into the home stretch, and this marvelous driver passed under the wire in 59 1-5 seconds, breaking world's record by two-fifths of a second.

The judges and timers were wildly enthusiastic, for the world's record for five miles had been lowered 3 4-5 seconds. The time was 5:00 3-5.

TEN MILES UNDER TEN MINUTES.

But this was not all. After these successes Oldfield was all the more ambitious to break the ten-mile record. Four other events were next pulled off, and once again the crowd grew expectant as "Barney" left the north gate, and flew down the homestretch. This time there was no slowing down. The machine was going at its best speed when it passed under the wire. Plainly Oldfield was out for time. He came around the north turn, close to the fence, having circled the course in 56⅖ seconds, 3 1-5 seconds better than his world's record made at Indianapolis, and 2 3-5 seconds better than the record he had made an hour before. He did the second mile in :59 flat, again beating the Indianapolis record. He equalled the records for three, five, six and nine miles, and went the fourth and eighth miles in one minute flat, and the seventh mile in 1:01. The ten miles were done in 9:54 4-5. Winton's last plume had been snatched from his cap. He had been bettered by 55 1-5 seconds.

RECEIVES OVATION MODESTLY.

A great ring of dust slowly drifted up from the track as Oldfield made another complete circuit in order to slow down and come to a stop. Cheer upon cheer greeted him as he drew up in front of the grand stand and hundreds of spectators left their seats and rushed to the track to get a look at "Barney," the intrepid. Calls for "Barney," and "Lift him on your shoulders, boys," were heard on every side. But one of the judges, John Y. Bassell, led him into the judges' stand, and introduced him to the people as the world's record holder for one, five, and ten miles. Again the crowd cheered for Oldfield, who was as cool, apparently, and smiling as before the start of the great ride.

The track was in good condition, though somewhat dry and dusty, which caused a great deal of loss by slipping on the turns. The weather was perfect. The trials were made under the rules of the American Automobile Association, and the records are official.

THE MINOR EVENTS.

Interest in the seven other events was about evenly divided. As the winner of each drew up in front of the judges' stand and received the beautiful first prize trophy cup, he was loudly applauded. The favorite, if there was any, was William Moneypenny, Jr., who won two five-mile events with his "Blue Devil" Stearns. But the feature of the afternoon in the minor events was the work done by D. M. Huss, driving an Olds machine owned by Frank E. Avery. He carried off three first prizes, winning two three-mile events and the ten-mile handicap. In the handicap race, Moneypenny, who finished second, started from scratch.

Dr. C, M. Taylor, president of the club, carried off the honors in the five-mile race for steamers with his White in 8:28.

The five-mile handicap motor-cycle race was won by E. Wollenweber in 8:35. It was both interesting and amusing. Three machines entered. The winner, who rode a three-horse power machine, was given a handicap of an eighth of a mile. E. C. Beyer, on a Mitchell, was on scratch, while R. P. Hixon was given a quarter of a mile handicap. Hixon dropped out on account of an accident. Beyer, who was three-quarters of a mile in the lead at the end of the third round, and whose number was thirteen, broke his driving belt on the homestretch and peddled to the judges' stand, winning the fourth lap. Wollenweber, the limit man, then passed him and won the race.

J. F. Dixon, driving a General car, pulled out of the ten-mile handicap at the end of the fifth mile, thinking the race was only a five-mile event.

SUMMARY OF THE DAY'S RACES.

The summary is as follows:

Five mile exhibition by Barney Oldfield—Time, 5:00 3-5. Times by miles: One mile, :59 1-5; two miles, (:59 4-5) 1:59; three miles, (1:00 4-5) 2:59 4-5; four miles, (1:00) 3:59 4-5; five miles, (1:00 4-5) 5:00 3-5.

Ten-mile exhibition by Barney Oldfield—Time, 9:54 4-5. Times by miles: One mile, :56 2-5; two miles, (:59) 1:55 2-5; three miles, (:59 3-5) 2:55; four miles, (1:00) 3:55; five miles, (:59 3-5) 4:54 3-5; six miles, (:59 3-5) 5:54 1-5; seven miles, (1:01) 6:55 1-5; eight miles (1:0) 7:55 1-5; nine miles, (:59 3-5) 8:54 4-5; ten miles, (1:00) 9:54 4-5.

Three-mile race for gasoline machines under 1,800 pounds—D. M. Huss, (Olds) first; J. F. Dixon, (General) second; J. O. McDonald, (Cadillac) third; Harry Mason, (Olds) fourth; H. A. Avery, (Olds) fifth; Joe Montoney, (Rambler) sixth. Time, 4:55 4-5.

Five-mile race for steam cars under 1,800 pounds—Dr. C. M. Taylor, (White) first; E. M. Lied, (White) second. Time, 8:28.

Five-mile open, for machines of all weights and powers—William Moneypenny, Jr., (Stearns, gasoline) first; J. F. Dixon, (General, gasoline) second; Dr. C. M. Taylor, (White, steam) third. Time, 7:37.

Five-mile race for gasoline cars over 1,800 pounds—William Moneypenny, Jr., (Stearns) first; William Neil (Winton) second. Time, 7:45.

Five-mile motor cycle handicap—E. Wollenweber, (Marsh) 1-8-mile handicap, first. Time, 8:35.

Three-mile race for gasoline cars under 1,800 pounds—D. M. Huss, (Olds) first; J. F. Dixon, (General) second. Time, 5:10.

Ten-mile handicap, open to all machines—D. M. Huss (Olds) first; William Moneypenny, Jr., (Stearns) second. Time, 15:28.

It has been proposed to provide the police and fire departments of St. Louis with automobiles to be used during the World's Fair. No united action has been taken, but considerable interest is manifest.

Motor Cycle Reliability Run.

Fourteen Contestants Out of Thirty-two Ride from New York to Worcester and Return With Perfect Scores.

Fourteen of the thirty-two motor cycle riders who started at 6 o'clock on the morning of July 3 to ride to Worcester, Mass., and back to New York in the motor cycle endurance run promoted jointly by

BIRD AND BOORMAN, FROM ST. PAUL.

the Metropole Cycling Club and the New York Motor Cycle Club, of New York, reached the last control at the New York Motor Cycle Club on 63rd street and Broadway on the afternoon of July 5 inside the time limit, all making perfect records of 1,000 points each; while two others arrived later in the evening, making scores of 940 points each.

The feature of the run was the close race for the gold medal to be awarded to the contestant who finished with a perfect score and also adhered most closely to the fast schedule of fifteen miles an hour for each day's run, without regard to any time allowances for meals or for passing through the different towns on the route, in all of which the rules strictly required that no rider should exceed a speed of eight miles an hour. On account of this, and the fact that no one rider went through without being more or less delayed from punctured tires or other troubles, the men who made the best scores were compelled to do a deal of fast riding, and sometimes over roads so rough or so deep in sand as to render fast riding a hazardous undertaking.

George M. Hendee, of the Hendee Mfg. Co., Springfield, Mass., the old time high-wheel champion, annexed the gold medal, riding his 1¾-horse power Indian throughout the run without any trouble aside from a punctured tire on the first stage of the run to Springfield on July 3. Hendee rode on a schedule, and carried his watch in his hand much of the time. The other riders were quick to discover this, and they took advantage of it by endeavoring to stay with the Springfield man. On the first day Hendee arrived at the right control in Springfield at 3.36:30 P. M., just thirty seconds ahead of schedule time. At the night control in Hartford on July 4 he was just one minute ahead of the schedule, arriving at 2.39 P. M. At New York on the following day the schedule was adhered to to the second, as also at all the day controls, Hendee arriving in New York at 2 o'clock sharp.

The weeding out was practically all done on the first day, thirteen of the starters failing to reach the night control in Springfield. On Saturday, July 4, only one rider dropped out. This was John E. Oest, No. 20, who rode the only foreign machine in the contest, a 1¾-horse power Werner. After leaving Springfield Oest was following close behind B. F. Doherty, No. 13, when the latter suddenly slowed up for a rough piece of road and Oest drove into him, bucking the rim of his front wheel and breaking out several spokes. Oest lost considerable time before he could get started again, and so did not continue on to Worcester. It is thought, however, that had he gone on he would have made up much of the lost time and would have still made a perfect score, though, of course,

THE START IN SPRINGFIELD, MASS.

he was hopelessly out of the running for the gold medal.

Of the remaining eighteen riders, the two who failed to reach New York were B. F. Doherty, No. 13, who gashed one of his tires so badly when nearing New York that he was unable to continue, and Charles M. Burnham, No. 19, who broke his frame after leaving Hartford.

Of the thirteen riders who failed to reach Springfield on the first day's run, Frank Zirbes, No. 1, lost the lubricating oil petcock off his motor between New Haven and Meriden. David Miller, No. 21, broke his frame back of the head after leaving New Britain. Geo. P. Jenkins, No. 9, tore the valve off his rear tire between Hartford and Meriden. Ellery C. Fisher, No. 27, broke the cushion attachment on the rear stays of his frame. C. S. Mankowski, No. 2, had so many punctures that, though he carried a most elaborate assortment of repair parts in a big grip fastened on his machine, he was unable to proceed beyond Norwalk, 42 miles out from New York. W. E. Hyde, No. 28, had tire troubles and dropped out at Meriden, though next day he rode on through to his home in Shrewsbury, Mass. G. N. Rogers, No. 12, had various and frequent troubles, chiefly with his carbureter. Mrs. G. N. Rogers, No. 29, stayed with her husband, and, regrettably, was soon out of the contest, though her machine did not give her a particle of trouble. George N. Holden, No. 30, ran out of New York very leisurly, but shortly after striking the Pelham Road he fell in with others who seemingly were intent on making him take dust, so he "let it all out," and began arriving at the controls away ahead of the 15-mile schedule reaching Hartford an hour and thirteen minutes ahead of time, so he was disqualified by the Referee. W. A. Roberts, No. 26, broke his exhaust valve after leaving New Britain, and rode into Hartford with his machine in a wagon, while Samuel McSkimen, No. 14, fell at the start and injured his leg and so did not go on.

The vicissitudes of the successful riders were many and varied, tire troubles delaying them the most Those who rode belt driven machines had considerable trouble from the connecting hooks or hinge pulling out or breaking. Engine troubles were few, which speaks well for the small motors used on the successful machines.

Of the three riders who reached New York after 5:15 P.M., when the control had closed for Class B, F. A. Bowen, No. 25, had to put in a new battery after leaving Norwalk, the one he was using having run down; then he fell and cut a hole in his gasoline tank, near the top, and, after he had started on, in some way the leaking gasoline caught fire, and the machine was quite badly burned. This rider was in Class A, however, and had till 7:15 P. M. to finish, and as he arrived at 6:42 he made a perfect score. A. A. Hoyt, No. 7, lost a plug out of his rear tire, after leaving Bridgeport, and was unable to get another plug to stay in, so he eventually poured sand into the tire, taped the hole over, and rode in on sand instead of air. F. C. Hanfeld, No. 36, stayed with Hoyt to help him, fully sympathyzing with the unfortu-

HENDEE, WINNER OF THE GOLD MEDAL.

nate for the reason that he had previously had punctures of his own, and so was also late in reaching the control.

The contest was a good test of the rider as well as the machine, for though most of the 396 miles was run over very good macadam roads, there were many strips of road that were deep in sand, and others that were very rough and stony. When a rider fell behind and was compelled to ride

catch up his lost time, it took both grit and skill to safely negotiate these pieces of bad road and get through near schedule time. However, though several nasty falls were taken, no one was hurt, and the run was a success in every way. The weather was peculiarly favorable, and B. B. Bird and R. R. Boorman, the riders from St. Paul, made a holiday of the entire trip. They were both untiring in their praise of the "beautiful roads," and Boorman amused everyone by persistently rlding sideways on his machine, as Bird said, "Like a farmer on a hayrack." He tried riding with his feet over the handlebars near Spencer, Mass., when his machine shot out from under him and he bit the dust in the true sense of the phrase.

The accompanying table gives the perfect marks for controls passed and the total minutes lost by each of the competitors making perfect scores.

Competitor.	Perfect Controls.	Minutes Lost.
G. M. Hendee, Springfield	6	2
Lincoln Holland, Worcester	6	2
C. N. Emerson, Lowell	5	10
George P. Peiper, Brooklyn	5	84½
J. M. O'Malley, Hartford	5	454
F. E. Damina, Providence	4	78½
J. H. Bartlett, New Britain	3	118½
Joseph Downey, Roslindale	2	23
J. W. White, New York	2	144
F. A. Bowen, Utica	2	350
N. P. Bernard, Hartford	2	676½
W. J. Zeigler, Elmwood	2	796½
R. R. Boorman, St. Paul	1	241
B. B. Bird, St. Paul	0	464½

George M. Hendee and Lincoln Holland each made six perfect scores and had each a total of two debit marks. Hendee was declared the winner, however, for the reason that he made perfect scores at all the secret controls, while Holland did not pass one of the secret controls at all. The secret controls were established by E. L. Ferguson, the chairman, to prevent the ziders from exceeding a speed of eight miles after entering the different cities when nearing the nigh controls.

The contest was in charge of E. L. Furguson, Chairman; Will R. Pitman, Referee; E. H. Cave, Assistant Referee, and William Stiff, Samuel E. Campbell, Jos. Goodman, J. E. Whitten, B. A. Campbell and Rowland Douglas, Checkers.

Last year, in the endurance run promoted by the Metropole Cycling Club from Boston to New York on July 4 and 5, thirteen of the thirty-one starters finished the run, and only seven made perfect scores. This year the run was longer by a day's run of 140 miles, yet the percentage of contestants that made perfect scores was practically double that of the run a year ago.

The permanent residents of Bar Harbor, Me., have recently voted to restrict the use of automobiles to the side streets of the village. The summer visitors, however, look upon this as a serious handicap to their pleasure.

MOTOR CYCLIST CROSSES CONTINENT IN FIFTY DAYS.

A feat that has "stumped" more than one powerful automobile had been successfully accomplished by a ninety-pound 1½-horsepower motor cycle when George A. Wyman jumped off his machine at the house of the New York Motor Cycle Club, 1904 Broadway, at 5.30 o'clock on the afternoon of Sunday, July 5, after having covered the entire distance from San Francisco to New York in fifty days. Wyman is only twenty years old, but he possesses an abundance of pluck. He endured keen hardship and successfully overcome every obstacle, riding 1,500 miles over railroad ties where the roads were impassable, crawling through snow sheds, wading through the sand of the desert lands, pedaling through mud and walking for miles and miles when other means of locomotion were impossible.

Wyman left San Francisco on May 17, arrived in Reno, Nevada, May 21, reached Omaha June 11, Chicago June 18, Buffalo June 30 and Albany on the Fourth of July. He pedalled nearly all the way from Albany to New York, the motor having finally become deranged beyond the ability to repair on the road, as a result of its wonderful performance. The machine gave him no serious trouble until 100 miles west of Chicago, when the crank pins, which had become badly worn, gave out and he was obliged to pedal into the Windy City, where he waited five days for new parts. Wyman states that he then got along all right until after leaving Albany, although he experienced more or less trouble in the vicinity of Buffalo, but after starting down the Hudson he was obliged to pedal into New York.

This trip is all the more remarkable when the very unfavorable weather conditions are considered. The middle west suffered the same continuous rains that prevailed throughout the east for weeks, and the roads, composed largely of clay, were rendered impassable. Nothing daunted, however, Wyman kept on, riding over railroad tracks until better roads were reached.

The machine ridden by Wyman was built by the California Motor Co., of San Francisco. The 1½-horsepower motor is mounted on and parallel to the lower cross tube of the bicycle frame; the flywheel is exposed and located on the side of the motor opposite to the belt pulley, the belt being flat and ¾ inch wide. The front wheel is shod with an 1½-inch pneumatic tire and the rear wheel with a 1¾-inch tire.

Fetch and Krarup Reach Salt Lake.

Special Correspondence.

SALT LAKE CITY, Utah, July 5.—Messrs. Fetch and Krarup, the two men who are crossing the continent in the Packard automobile nominated "Pacific," have arrived here in good condition after a trying trip across the mountains of Nevada. Grades of 35 per cent. and more were occasionally encountered, while near Tecoma, Nev., a 39 per cent. rise had to be climbed, but luckily the hill was only 300 feet long. Sixty miles of the road in the neighborhood of Promontory, Utah, were very hard on the tires, owing to washouts and an almost untraveled road through rocky country. The last 100 miles into Salt Lake City were easier on both machines and men, who arrived in condition to be able to start eastward from here the following day.

Another Transcontinental Trial Started.

Special Correspondence.

SAN FRANCISCO, July 6.—Another attempt to drive from the Pacific to New York on the Atlantic was begun to-day, when L. L. Whitman, accompanied by E. L. Hammond, left in an automobile runabout to cross the country. They came here from Pasadena and will follow the Central Pacific and Union Pacific railroads. They expect to make the trip in sixty days. They carry a message from Mayor Schmitz of San Francisco to Mayor Low of New York.

Touring to the Pacific.

Horace and Robert C. H. Brock, two wealthy Philadelphians who are touring across the country in a Winton touring car, reached Ottumwa, Iowa, on June 29, having started from Atlantic City several weeks before. They have been making the trip leisurely, but Horace got tired and returned East from Ottumwa. His brother however, continued on, accompanied by his chauffeur, and said he would go through Colorado and into California but had no idea when he would reach San Francisco or Los Angeles.

Circuit des Ardennes.

(*Continued from page 33.*)

400 to 700 kilos. Barras in a 40-horsepower Darracq finished first, making one complete circuit in the fast time of 59: 20

TIMES OF LIGHT CAR DRIVERS.

Baras	Darracq	6::30::38:1-5
Tavenaux	Gobron-Brillié	6::56:: 1:1-5
Cagno	F. I. A. T.	7:: 6::36
Osmont	Darracq	7::16::30:2-5
Hemery	Darracq	7::33::48
Journu	de Dion-Bouton	8:: 2::10
Bardin	de Dion-Bouton	8::16::48

On the following day the voiturettes were tried out over a short course of about 175 miles, starting and ending at the town of Arlon. In this competition the Darracq cars also showed up well, winning both first and second places.

The time for the leading car was 3:55: 27 1-5.

In the motor cycle race ten finished, Demester on a Griffon leading at the finish, his time for the distance being 4: 59: 46 3-5.

Salt Lake City has had her first automobile race. At Liberty Park, on June 30, in the presence of several thousand spectators, Charles S. Wilkes, in a stripped 5-horsepower Oldsmobile won a mile race from F. J Carter, in a 6-horse Rambler.

Rain Interferes with Minneapolis Races.

Special Correspondence.

MINNEAPOLIS, July 4.—Only one day of automobile racing has been possible out of the five days scheduled for the past week at the horse show at the State Fair track at Hamline, under the auspices of the Minneapolis Riding and Driving Club. On each of the four other days it rained so that the races had to be postponed. But Manager R. F. Jones pluckily says he is going to fight it out with the weather, and has advertised the races for to morrow and Monday and Tuesday.

The event run last Wednesday was a five-mile "derby," open to all machines. E. H. Moulten, Jr., won the race, which was run in two heats. His Peerless, operated by H. D. Savage, won the first heat in 8:34. Mr. Moulten operated his second Peerless in the second heat, and should have won this by a greater margin. He had a lead of more than 200 feet over George W. Peavey's 20 hore-power Winton at the end of the first mile and was increasing it on the second mile when something went wrong and he had to withdraw from the race. It was found afterward the gasoline had been turned off accidentally.

The first heat was an interesting exhibition of speed between H. D. Savage, in the Peerless, and J. B. Gilfillan, Jr., who drove his 20-horsepower Winton. The other contestant was Charles P. Joy, of St. Paul, in his six-horse power Rambler. This machine dropped behind on the first mile, being far outclassed.

Savage led Gilfillan by only a few feet when the machines crossed the tape at the end of the first mile, finishing in 1:52. His lead was maintained for another mile, but in the third lap Gilfillan overtook the Peerless, and had gained a small lead at the end of the third mile. On the back stretch Savage went up into the lead again, and after that was not passed. He won the heat by one hundred feet in 8:34.

In the second heat E. H. Moulten, Jr., covered the first mile in 1:37¼ in his Peerless gaining a lead of 200 feet on A. C. Bennett, driving G. W. Peavey's Winton, but slowed down after passing the quarter post in the second mile. As he was then far in the lead, it was at first thought that he was merely waiting for Peavey to come up so as to make the race more interesting, but the Winton crawled up on him and passed while the Peerless continued slowly around and then withdrew. The rest of the race was uninteresting, it simply being an exhibition of speed on the part of Gilfillan, who won in 8:39¾. Bennett finished a mile to the bad.

H. D. SAVAGE IN E H. MOULTEN JR.'S PEERLESS, WINNER FIVE MILE DERBY AT MINNEAPOLIS.

The judges awarded the prizes as follows: E. H. Moulten, Peerless (H. D. Savage, driver), first; J. B. Gilfillan, Jr., Winton (Gilfillan, driver), second; G. W. Peavey, Winton (A. C. Bennett), third.

Race Meets Sanctioned.

The American Automobile Association has granted racing privileges for a series of contests to be held under the auspices of the Indianapolis Racing Association, a Marion, Ind., on July 9; at Jackson, Mich., July 16, and at Elkhart, Ind., July 18. The complete list of entries is not yet available although arrangements have been made with Tom Cooper and Barney Oldfield for a series of races at both Elkhart and Marion. At Elkhart there will be three five-mile heats against time.

The A. A. A. will also sanction a race meet at Beachwood, Pa., to be conducted by the Automobile Club of Pittsburg, on July 11, where an attempt will be made to break the straight-away mile record.

KISER AND FISHER THE ATTRACTION AT LEXINGTON JULY 4.

Special Correspondence.

LEXINGTON, Ky., July 6.—The first automobile races ever held in this state were run here last Saturday by the Indianapolis Automobile Racing Association. The most interesting events were a five-mile handicap and a five-mile race for gasoline machines. The handicap went to the limit man, Jack Graham, of Chicago who had a handicap of three minutes. Carl Fisher, of Indianapolis, with a handicap of 3:15, ran second, and Earl Kiser, of Dayton, with a handicap of 3:30, finished third. Time, 11:05.

Kiser won the five-mile open from Fisher in 8:09¼, with Graham third.

A race between local operators, at five miles, went to William Minn in 11:02 1-5.

Tom Cooper was to have made a five-mile exhibition ride against the record, but in doing a warming-up mile he broke one of the connecting rods of his Ford-Cooper racer and was unable to make the trial.

The new Illinois automobile law went into effect on July 1. It limits the legal speed to fifteen miles throughout the state, excepting on courses where special privileges may have been granted for contests.

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SATURDAY, JULY 11, 1903.

LESSONS FROM DEFEAT.

Until the arrival of more extensive reports of the Gordon Bennett race by mail, it is rather dangerous to discuss in detail the work of the American team. Whatever extenuating circumstances these reports may disclose, however, there is no getting away from the fact that our team was outclassed and that we were simply not in it from start to finish. To eat crow is not conducive to a happy frame of mind, but it can be stomached with a show of grace if only there is something better in prospect.

As individuals the members of the American team seem to have done their best, and how far force of circumstances affected their judgment cannot now be told. The world of sport will, however, not give them credit for good judgment, and we can be sure that the results of the race will be used as a strong argument to prejudice foreign buyers against American machines.

This raises the point as to the wisdom of American builders competing in international road races at all—a very debatable point indeed. It is an open secret that no disinterested persons on this side of the Atlantic expected the American team to win—barring accidents. Compared with drivers for the other competing nations, our men were simply novices in the road racing game. They are all busy business men who, even if they had opportunities for practice in road racing at the highest speeds, have not the time to become as expert as the foreign professional and amateur drivers.

It is no discredit to the team to say the truth—that there are many American chauffeurs who are better qualified to take part in such a contest.

In driving, so in construction. Experience in building touring cars or even track racing machines is not sufficient preparation for the contsruction of high powered road racing cars, especially when entering into direct competition with builders who have led in racing machine construction from the beginning.

American construction is and must be essentially different from that followed in the European shops. Our roads, with insignificant exceptions, are vile. In the country as a whole there is practically no leisure class and machines for home consumption must be built to carry their owners to and fro not at breakneck speed but at moderate speeds—with certainty. For these reasons the great development so far in this country has been in the runabout, a type that, cost considered, will bear comparison with anything turned out by any other nation.

In fast machines, of very high power, we are practically not in the running. Would it not be wiser, therefore, to confine our public competitive efforts to machines such as are needed in our own market?

A road race confined to American cars of, say, 12 to 35 horse power would be of tremendous interest and would do far more for the industry than any dawdling reliability run which demonstrates chiefly what a car will not do and not what it will do. In such a race there would be no handicap in the way of construction or operation. American types and American drivers would be pitted against each other and we would not be compelled to make a showing in competition with fast cars of a type entirely unsuited to American conditions.

CHEMISTRY OF THE MIXTURE.

On the subject of the correct mixing of hydro-carbon vapors and air a correspondent asks: "Of the two grades of gasoline 76° and 68° Beaumé Scale, which would require a greater volume of air for a given volume of vapor in order to produce perfect combustion? Also please submit chemical formula for ordinary gasoline and the difference in the formulas for the different densities?"

The light mineral oils of commerce designated gasoline, naptha, and benzine are products obtained by the distillation of crude petroleum.

When petroleum is subjected to heat, it does not vaporize completely at one temperature as does a single compound such as water or alcohol, but it is necessary to increase the heat continuously, and if the vapor be condensed, the condensation products increase in density with the temperature of the still. These condensation products are differentiated arbitrarily at certain temperature points, and classified: for instance,

	Specific Gravity,	Boiling Point. Centigrade.
Gasoline....	.666–.680	70°– 90°
Naphtha....	.680–.700	80°–110°
Benzine....	.730–.750	120°–150°

Petroleum is not a single chemical compound, but consists chiefly of a mixture of isomeric and homologous paraffins in which the normal paraffins predominate. A complete series of paraffins from CH_4 to $C_{16}H_{34}$ have been obtained from it, also the olefins from $C_{10}H_{20}$ to $C_{12}H_{24}$ and small quantities of homologous compounds. The paraffins of the series from C_5H_{12} to $C_{15}H_{32}$ constitute the greater portion of the liquid part of petroleum. None of the commercial products from it are single chemical compounds, with a simple formula but mixtures with certain paraffins predominating.

A gasoline of a specific gravity of .680 consists largely of a mixture of hexane, C_6H_{14} and heptane, C_7H_{16}, with small quantities of the lighter olefins and homologous compouuds.

A benzine of a specific gravity of .760 contains a larger quantity of heptane and the higher paraffins and a proportionately smaller amount of hexane and the lower paraffins.

The thoeretical combustion of the oils may be shown best by taking the paraffins, hexane, C_6H_{14}, and heptane C_7H_{16}, and combining each with oxypen, O the vital element of air.

For perfect combustion one molecule of hexane would require nineteen atoms of oxygen and there would be produced six molecules of carbon dioxide and seven molecules of water:

$$C_6H_{14} + 19\,O = 6\,CO_2 + 7\,H_2O.$$

One molecule of heptane would require twenty-two atoms of oxygen and there would be produced seven molecules of carbon dioxide and eight molcules of water:

$$C_7H_{16} + 22\,O = 7\,CO_2 + 8\,H_2O.$$

Since according to Avogardro's Law, equal volumes of gases (or vapors) at equal temperatures and pressures contain an equal number of molecules, there would be the same number of molecules of heptane as of hexane in a given volume of vapor under the same physical conditions. Since a molecule of heptane requires more oxygen for perfect combustion than a molecule of hexane, a given volume of heptane would require a greater volume of oxygen than the same volume of hexane.

Consequently the statement may be made that in general a higher specific gravity in a petroleum oil shows that the oil consists of paraffins higher in the series in molecular construction, and

therefore, would require more air to insure perfect combustion.

RAILROADS AND THE AUTOMOBILE.

In the July issue of *The Engineering Magazine* a contributor discusses at some length the statement, attributed to Sir Henry Norman among others, that the automobile is going to make great inroads on the business of the steam railways. The article is very interesting, indeed, but the writer makes the mistake of taking too seriously the many well meaning enthusiasts in whose mental process exaggeration is a prime mover.

If the writer will recall the early days of the industrial application of electricity, no statement was more frequently made by the man in the street than that electricity would do this, that and the other thing and that it would do away with the steam engine. Probably those progressive persons believed that all one had to do to secure an unfailing supply of electricity was to stick a conductor up in the air and draw down the "juice" a la Franklin.

The automobile is such a useful machine and does so much more than the novice would suppose that it is no wonder that he goes to the extreme of claiming all sorts of impossibilities for it. Compete with the direct line of railroad it certainly will in suburban passenger travel, for instance, but hardly to such an extent as will affect the stockholders' pockets. In most other respects it will be the greatest feeder the railroad has ever had. In the transportation of freight in districts where the cost of laying rails would be prohibitive the automobile will reach out from the regular railroad depots in a maze of lines. In the building up of local communties it will be one of the greatest civilizing factors, thereby increasing the uses of the long distance steam road many fold. It will indeed open up routes in which the volume of traffic will become so great that the railroad must follow. In a thousand ways it will supplement and amplify the railroad systems. As to superseding them—well, the development of the automobile is is the hands of engineers and industrial financiers, and is not controlled by the empirical opinions of popular magazine writers and the man in the street.

Reversed on a Technicality.

An automobile case that has been pending since last Novemebr when Cord Meyer, of New York, was arrested on the Jericho Turnpike, between Mineola and Westbury, Long Island, and adjudged guilty of driving his automobile one-eighth of a mile in sixteen seconds, for which offence he was fined $30, has recently been reversed on appeal, by County Judge Seabury, of Mineola. The Judge based his decision on the ground that the prosecution should prove that the road where the alleged offense was committed was a public highway, which it failed to do.

October Reliability Run to Pittsburg.

The proposed reliability run of the National Association of Automobile Manufacturers was discussed at a special meetings of the technical and executive committees of the association held last Tuesday and Wednesday. Although the details for the run will not be decided upon until the course has been covered in a machine by members of the committee to obtain full and reliable information regarding distances, road conditions and other necessary points, it was decided that Pittsburg would be the destination, the start being made in New York City, with night stops in Philadelphia, Washington, Hagerstown and some other places not yet decided upon about midway between Hagerstown and Pittsburg.

Middle October is the time selected for the run, which will be begun on a Friday. The following Sunday will be spent in Washington. The run to Pittsburg will thus consume five days and after the arrival there two or three days will be devoted to speed trials, hill climbing contests and fuel consumption tests. The distance to Pittsburg by the route selected is approximately 560 miles.

Harry Unwin, secretary of the association, is to start over the proposed course on Monday, July 13, with the object of selecting the most desirable route, collecting complete information about hotels, stopping places, road conditions and other matters of importance. He expects to be gone for two weeks or more. He will make the journey in an automobile, and the information collected will be of great value in arranging the details. Later on, signs will be posted at every point of doubt along the course, so that the contestants will have no trouble in keeping on the right road.

The American Automobile Association has been asked to co-operate with the makers' association to make the fall run a large success and with this in view Dr. Julian Chase, of the Rhode Island A. C., president of the A. A. A., and A. R. Pardington, of the Long Island A. C., chairman of the racing committee of the A. A. A., were present at the meeting of the N. A. A. M. executive committee, which was also attended by President M. J. Budlong, First Vice-President H. Ward Leonard, Third Vice-President Charles Clifton, W. D. Gash, Col. K. C. Pardee, Paul H. Deming, I. H. Page, S. T. Davis, Jr., Charles E. Duryea, Manager S. A. Miles and Secretary Harry Unwin.

The official aid which the makers ask of the automobile clubs was thoroughly explained to the A. A. A. representatives, and the plan will be acted upon at an early meeting of the board of directors, which consists of President Chase, W. E. Scarritt, A. C. A.; Frank G. Webb, L. I. A. C.; Dr. W. E. Milbank, Albany A. C.; W. J. Stewart, N. J. A. C.; F. C. Lewin, Philadelphia A. C.; M. C. Fleischmann, Cincinnati A. C., and Chairman A. R. Pardington.

The decision of this body relative to the run is expected to be favorable. It is intimated that there will be a radical departure from previous contests in the matter of official observers, the intent of the organizers of the contest being to surround it with such stringent regulations and safeguards as will command the respect and attention of the public. The road and other conditions will also probably be a more severe test than in former runs.

Details of the run will not be made public until the plans and arrangements have been approved by both the National Association of Automobile Manufacturers and the American Automobile Association.

At the Wednesday meeting of the executive committee of the N. A. A. M. it was also decided not to hold a test of commercial vehicle next fall.

The recent frequent arrests of drivers of demonstration cars in New York City as a result of the failure of the new Bailey automobile law to provide for some means of distinguishing such machines, which are exempt from the license requirement, from private vehicles was discussed and it was decided to take some early action looking to a settlement of the matter in the courts.

Match Races for Empire Track.

Articles of agreement have been signed for a triangular match race to be run on the Empire City track at Yonkers, N. Y., on July 25 between C. G. Wridgway, driving an 80-horsepower Peerless; Laurent Grosse, driving O. W. Bright's 60-horsepower Mercedes, and E. H. Fredrich, driving a 30-horsepower Decauville.

F. A. La Roche, of the Darracq agency in New York, has issued a challenge to meet all comers on the Empire track at the same meet and has posted a forfeit of $500 with the track management to assure the event. The challenge has been accepted by Barney Oldfield, who drove his Ford-Cooper racer a mile in 1:00 3-5, at the Empire track on Decoration Day, but not satisfied with this performance, broke all world's track records from one to five miles, inclusive, at Indianapolis on June 20, covering the mile in 0:59 3-5, and later, at Columbus, on July 4, drove his famous "999" over the mile in the wonderful time of 0:56 2-5, and ten miles in 9:54 4-5.

Oldfield accepted La Roche's challenge by wire, and racing enthusiasts are looking forward to the 25th with keen anticipation. It is understood that La Roche will use a 60-horsepower Darracq, of this year's Paris-Madrid type, which he has recently imported.

Gordon Bennett Awards and Kilometer Trials.

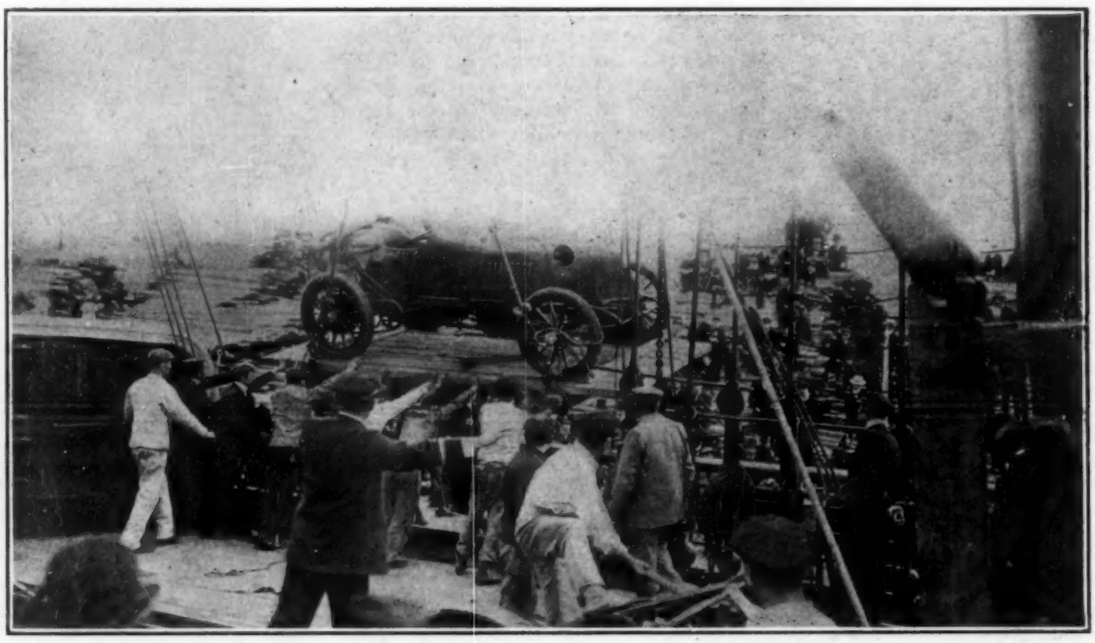
The official report of the results of the Gordon Bennett Cup race, as amended by the international delegates, was given to the world on July 3, and Jenatzy, of Germany, who drove a 60-horse power Mercedes car, whose victory was anticipated, at once became the hero of the day when it was found that he had outdistanced his nearest rival, De Knyff, of France, by eleven minutes, at the same time lowering the speed record for the great race, having averaged 49½ miles an hour—excluding imposed stops—over the entire course of 368 miles 750 yards. Farman, who finished third, was only one minute and four seconds behind De Knyff, and Gabriel, also of the French team, was fourth. The pleasant relations existing between John Bull and Uncle Sam were not disturbed as a result of the contest, but the French and Germans, hereditary enemies, carried their national pride to Ireland, and fought desperately for honors all day long.

Not a personal accident of any kind occurred, excepting to the popular English driver Jarrot and his chauffeur, and that was due to no fault of the management. Nearly 4,000 constabulary were employed to keep the course clear, and everyone present agreed that no similar contest has ever taken place, where public and private safety was so well guarded.

The French team was the only one of which all its members finished, and it made a splendid showing, De Knyff, Farman, and Gabriel, coming in second, third and fourth, with a total of only twenty minutes separating them. The Montagu Cup, offered for the best team time, therefore goes to France. Although the American team was early out of the running, it is good to know that Foxhall Keene, who drove as a member of the German team, exhibited daring with the best of the contestants, going around the course three times, with an axle cracked half way through, and only giving up at last by direction of the control officials. The winning Mercedes, driven by the fearless Jenatzy, is destined to find a home on this side of the Atlantic. It is the property of Clarence Gray Dinsmore, of the A. C. A., who loaned it to the German team for the contest, owing to the destruction, in the Constadt fire, of the specially built machine. Baron de Caters stood an excellent chance for second place, but just ten miles from the finish his axle broke, and he was forced to abandon the contest. This was not only a keen disappointment to the plucky Baron, but also to the crowd, in a sense, for he had won all hearts earlier in the day, when he stopped at the grandstand to report Jarrot not seriously hurt, just at a moment when everyone feared the Englishman had been killed with the overturning of his machine.

The official summary of the race follows:

1. Jenatzy, German Mercedes, 6:39:00
2. De Knyff, French, Panhard, 6:50:40
3. Farman, French, Panhard, 6:51:44
4. Gabriel, French, Mors, 7:11:33
5. Edge, English, Napier, 9:18:48



UNLOADING THE MORS GORDON BENNETT RACER FROM S.S. DE LESSEPS AT DUBLIN.

KILOMETER RECORD BROKEN.

The next event of the Irish Fortnight as the two weeks of races, endurance runs and country trips is known, took place in the Phœnix Park, Dublin, on July 4, interest centering in the flying kilometer contests, as it was the evident intention of the competitors to break the existing record. This was accomplished by Gabriel the winner of the first stage of the Paris-Madrid race, who made the flying kilometer in 0:26 4-5 seconds, which is equivalent to 85½ miles an hour. Baron de Forest won the 100-guinea challenge cup, for vehicles weighing under 1,000 kilos, his time for the kilometer being 0:27 1-5 seconds. Not satisfied with this achievement the Baron promptly won the Autocar cup, making the kilometer in the remarkable time of 0:26 3-5.

A. C. A. Mid-Summer Run.

Since the Automobile Club of America gracefully abandoned the proposed endurance run to Montreal, out of deference to the N. A. A. M., which is giving its support to an endurance contest to Pittsburg, some of the members have favored a mid-summer touring trip strictly for the enjoyment that it would afford those participating. The matter has now taken tangible form, and a two days' jaunt will be started late in July, extending down the Jersey coast, over the almost perfect roads which have made that state famous in automobile circles.

"What is the difference between a chafeur and a grain broker?"

"Well, I give it up."

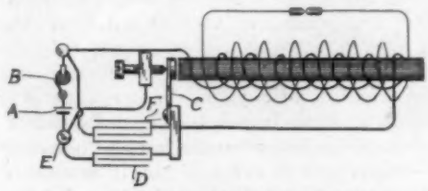
"You see, one 'negotiates' a corner while the other 'runs' it."

Patents

Auxiliary Condenser.

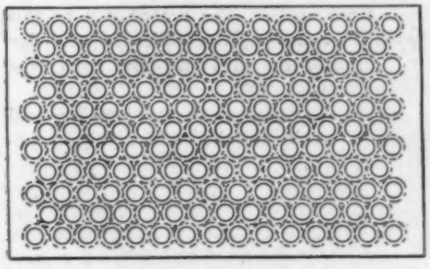
No. 732,014.—John Splitdorf, of New York.

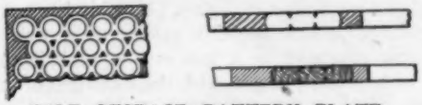
This device is intended for vibrator coils used with motors whose speed over-



SPLITDORF AUXILIARY SPARK CONDENSER.

runs that at which the vibrator can work efficiently, causing "sticking" of the vibrator. It is essentially a condenser connected across the regular primary make-and-break on the 2 to 1 shaft, and when the vibrator fails to work it acts to suppress the flash at the break of said make-and-break, so that this break will produce an effective spark current in the secondary coil. In the drawing, *A* is the battery, *B* the primary make-and-break, and *C* the vibrator. *D* is the regular condenser, having one terminal connected to the vibrator base and one to the battery binding post *E*. *F* is the auxiliary condenser, having one terminal connected to the vibrator and the other to the primary beyond *B*. Thus *D* is in shunt around the vibrator contacts and *F* is in shunt around both the make-and-break and the vibrator. Evidently the effectiveness of a given condenser thus used will depend largely on the rapidity of the break, which will usually be slower than that of the vibrator. The spark will also occur later than if the vibrator were working, but this might be





GALE STORAGE BATTERY PLATE.

compensated for, if the operator were aware that the vibrator was sticking, by sufficiently advancing the spark.

Process of Making Storage Battery Plates.

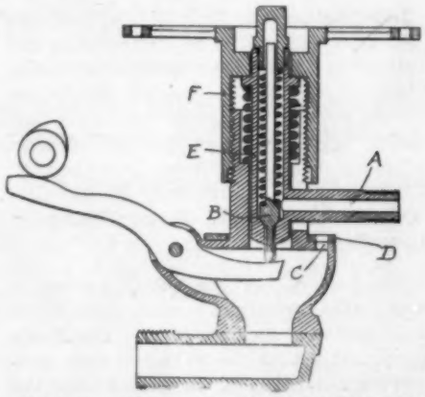
No. 731,447.—G. H. Gale, of Detroit, Mich.

The plate is drilled at regular intervals, and a cutting tool then employed to enlarge each hole in the interior of the plate, the enlarged holes meeting each other with triangular sections of metal left untouched to tie the two sides of the plate together. The space thus cut out of the plate is packed with active material.

Carbureter.

No. 731,547.—J. Corne, P. Duffau, and P. Baratbié, of Villeneuve-Sur-Lot, France.

Gasoline enters by pipe *A*, and is admitted to the mixing chamber through needle valve *B*, worked by the cam and lever seen. Air enters by holes *C*, which may be regulated by the shutter *D*. The barrel *E* and pipe *A* may be raised or lowered bodily by screwing cap *F* up or



FRENCH POSITIVE FEED CARBURETER.

down, and by this means the lift of valve *B* may be regulated.

Speed Gear With Magnetic Clutches.

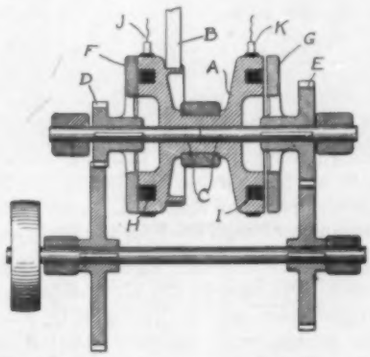
No. 731,472.—L. J. Le Pontois, of New York.

A is the driving member, actuated by a belt *B* or otherwise, and turning freely on the divided shaft *C*. *D E* are two pinions spliced on *C* and meshing with the drive gears. *F G* are armatures which may be magnetically locked to the poles of one or the other clutch by the excitation of coil *H* or *I*. *J* and *K* are brushes conveying current to the coils.

Catalytic Igniter.

No. 731,781.—T. B. Jeffrey, of Kenosha, Wis.

The mixture enters *A* passing through a cylindrical chamber *B* on its way to the cylinder. In *B* is a plug *C* drilled as shown and carrying on its end a sleeve *D* of the catalytic substance, as platinum gauze. *D* is slightly larger than the end *E* of the plug, so that it is not cooled by the latter. The gas which is to heat *D* by impinging on it enters by way of chamber *F* and the hole drilled through the plug stem, and is prevented by a check valve in *F* from being forced back. The normal position of *C* is as shown, but at the proper time for ignition it is shifted quickly to the right by arm *G* and cam *H*, till *D* is exposed to the gases in the cylinder. This forces a sharp stream of gas and mixture from chambers *B* and *F* through the holes in the plug on to *D*, causing it to become incandescent long enough to ignite the charge. Several practical obstacles, notably in the way



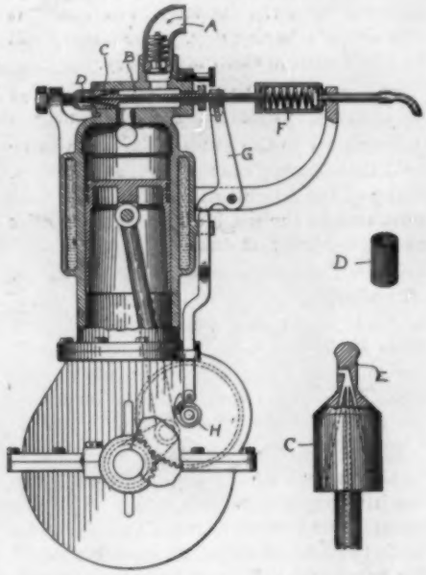
LE PONTOIS MAGNETIC CHANGE GEAR.

of lubricating the plug and stem, might be suggested against this system.

Rear Wheel Brake.

No. 731,753.—F. Charron and L. Girardot, of Paris, France.

The C. G. and V. brake which has been illustrated in these columns. It comprises an expanding ring working inside the sprocket wheel and supported by a link rising from the axle, the cut ends of the ring being down. The ring is expanded by the pull of a cable working on a toggle joint,



JEFFREY CATALYTIC IGNITION DEVICE.

and its tendency to rotate with the wheel when expanded is resisted by a radius bar attached at one end to the link aforesaid and fulcrumed at the other on the same pin which holds the forward end of the distance rod, so that the two rods swing up or down together.

News and Trade Miscellany.

J. M. Edsall has been elected Secretary of the E. R. Thomas Motor Company, Buffalo, New York.

Grout Bros., Orange, Mass., have just delivered to the National Biscuit Company a 10-horsepower steam delivery wagon.

Dr. Willard T. Parker, of New York, has recently purchased one of the well-known Clement tonneau type cars. Dr. Parker is an enthusiastic motorist.

Extensive plans for building electric trucks are being made by the Electric Vehicle Company of Hartford, Conn. This will be a new line of work for the Company.

A new automobile station has been opened by Cameron & Whitten at 282 Worthingston street, Springfield, Mass. This garage was formerly located on Dwight Street.

The American Automobile Storage Co., of New York, has opened a branch at Long Branch, New Jersey, as a salesroom for gasoline automobiles, with storage facilities for 75 machines. J. H. Manning is in charge of this branch.

The Parlor City Automobile Company, Binghamton, N. Y., which was organized last March, has purchased a plot of ground and has erected a temporary building, but will erect a brick building in the Fall with a well-equipped repair shop.

The Salisbury Wheel & Mfg. Co., Jamestown, N. Y., has purchased a building site and will erect a large factory, which it is said will have the capacity of turning out fifty sets of wheels a day. The factory will be fitted with modern machinery.

The New York State Fair track at Syracuse is being banked and repaired preparatory to the automobile races to be held there during the week of September 6. Many of the automobilists of the city take runs around the track every night in order to get it hardened down.

The village of Lancaster, O., has passed an ordinance restricting the speed of automobiles within the village limits to ten miles an hour. A fine of not less than $5 nor more than $25 is provided for offenders. The peculiar part of the action is that the town does not boast of an automobile.

Efforts are being made in Sioux Falls, S. D., to enlist local capital in an autocoach transportation line there. The promoters are confident that such a line can be made to pay. If sufficient capital is raised the company will start with one coach. If this proves successful others will be added.

A. B. Henley, who was formerly connected with the American Bicycle Company and also with the A. Clement Cycle Motor & Light Carriage Co., Hartford, Conn., assumed his new position as salesman with the Electric Vehicle Company of the same city on July 1.

An invitation is offered by the Locomobile Company to all yachtsmen cruising in Long Island Sound to visit the works at Bridgeport. The plant is located at the water's side and there is a sufficient depth of water at all stages of the tide to accommodate yachts at the company's wharf.

Sherman Becker, who recently made a 260-mile automobile ride through Madison, Janesville, Delavan, Lake Geneva and Burlington, in fourteen hours' running time, says this is no time to tour in Wisconsin, as "the farmers are all working out their road taxes." Every American road traveler knows the significance of this.

The Automobile Club of St. Paul has just issued its articles of incorporation and by-laws in booklet form, and is distributing also a reprint of the new automobile law passed by the Minnesota legislature last spring, and approved on April 21. Officers of the club are as follows: President, R. C. Wright; Vice-President, P. H. Gotzian; Secretary, A. W. Farrar; Treasurer, Gustave Scholle.

The Locomobile Company of America is now making deliveries at early dates of the 16-horsepower gasoline cars. The Company states that the rating is very conservative and that on the testing stand the motors develop 24 to 26 brake horsepower. Arthur Butler, a Wall Street business man, recently made a non-stop run from Bridgeport to New York in one of these cars which he had received at the works.

The Remington Motor Vehicle Company, Utica, New York, issues a very neat little pamphlet illustrating and describing its automobiles. The machines are fitted with two cylinder 10-horsepower engines, sliding gear transmission, with three speeds forward and reverse controlled by one lever. The cars are handsomely upholstered in leather and seat five comfortably. They are geared for a maximum speed of twenty miles an hour.

Several automobile races were features of the week of horse racing that ended on the Newport track near Cincinnati on June 27. These events were run on two successive Saturdays. The two professional races were run by Charles Hanauer. An amateur race on the closing day was won by L. K. DeBus in the same machine with which Hanauer won his races, DeBus's time for five miles being 10:39½.

The first automobile races ever held in Omaha, Neb., were run at the old Exposition Park track in conjunction with motor cycle and bicycle races. Only three automobiles competed, and there were but two events for them. A three-mile free-for-all was won by Mr. Frederickson in 6.02 from Mr. Brendeis, and a three-mile dash for gasoline machines was won by Frederickson from Mr. Decker.

In order to take care of its rapidly increasing business, the Hyatt Roller Bearing Co. has found it necessary to largely increase its manufacturing facilities. An addition to the plant at Harrison, N. J. 100 feet long by 50 feet wide is now being built. The Fordmobile Co., Detroit, is reported to have adopted the Hyatt roller bearings exclusively for its 1903 runabouts.

C. Arthur Benjamin, of Syracuse, had a novel experience on a recent trip to South Bay and one which he does not care to have repeated. He was running along quietly behind a young farmer when the latter's horse began to shy. Benjamin shut off his power but the farmer pointed a revolver at him and told him if he moved he would put a hole through him. Benjamin tried to remonstrate but it did no good. He kept Benjamin covered until he had driven out of sight. Benjamin offered $10 to the farmers of the vicinity if they would tell him the man's name but no one knew it.

Cleaver Cars in Fond du Lac.

Special Correspondence.

MILWAUKEE, July 6.—The Cleaver Motor Vehicle Co., of Fond du Lac, has turned out its first machine. The company will put out two styles of gasoline automobiles, one of 12-horse-power, with two seats, weighing about 1,000 pounds, and the other a truck with the engine under the front seat. F. C. Cleaver, formerly superintendent of motive power and cars for the Wisconsin Central railroad, is at the head of the Fond du Lac enterpise.

Four-Ton Truck for Milwaukee.

Special Correspondence.

MILWAUKEE, July 6.— The Johnson Service Company is having constructed a new four-ton electric truck. It will be used for delivery work. The company now has in use a truck capable of carrying 4,000 pounds and which has thus far traveled 1,000 miles. The record trip of this machine was forty-five miles in one day with a 4,000-pound load. The total cost of the trip was $3.

The new truck, which the company will have in use before the end of July, is being built in Brooklyn.

"Gas Engine Troubles and Remedies."

"Gas Engine Troubles and Remedies," by Albert Stritmatter, is the title of a new book published by the Gas Engine Publishing Company, Cincinnati, O. This book is largely a reprint of a series of articles that appeared in a gas engine periodical, with some changes and the addition of a number of illustrations. As the author states in the preface, the volume is not intended as a text-book on the construction of stationary gas engines, but rather as a guide to their proper care and operation. Special chapters are devoted to timing, ignition, fuel consumption, lubrication, feed supply, starting, and judging conditions by noises. "Gas Engine Troubles and Remedies," Albert Stritmatter, The Gas Engine Publishing Co., Price in cloth, $1.00.